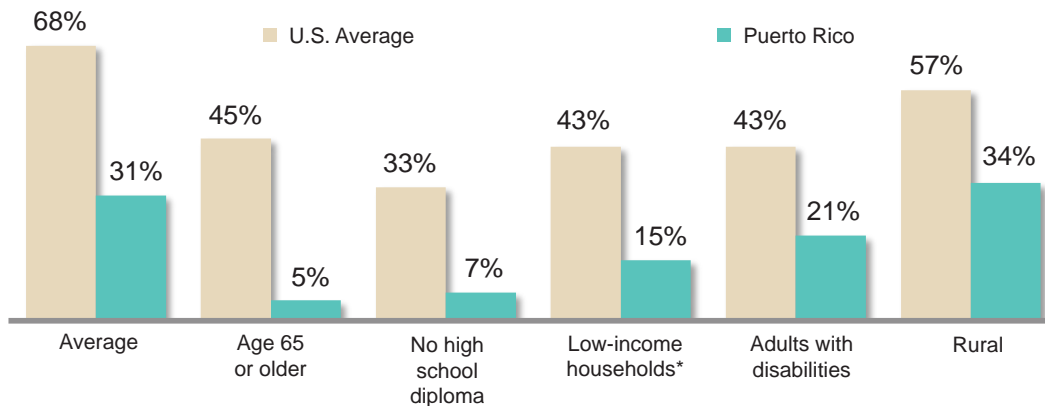


Only 15% of Puerto Ricans earning less than \$15,000 annual income subscribe to broadband.

Figure III.10 - U.S. and Puerto Rico Residential Broadband Adoption by Demographic Group



* U.S. low-income = households reporting annual income below \$25,000. Puerto Rico low-income = households reporting annual income below \$15,000.

b. Barriers to Adoption

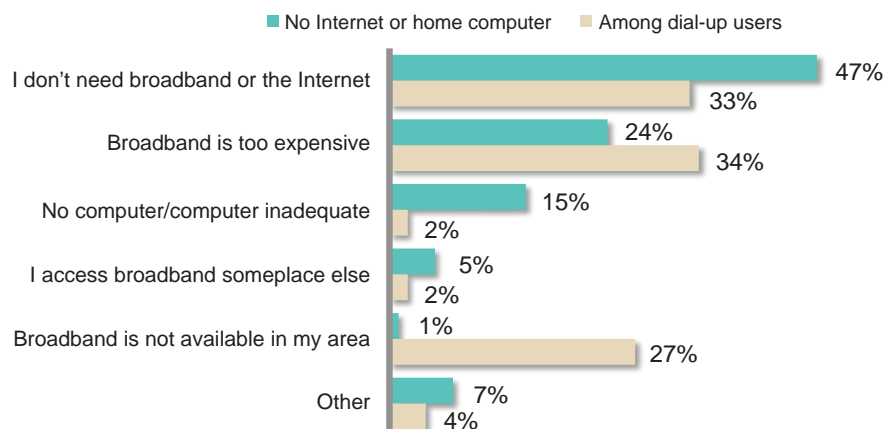
This section will analyze and compare barriers to computer ownership and broadband adoption reported among Puerto Rico and U.S. households. The factors impeding more robust computer ownership and broadband adoption are varied and are likely to have significant policy implications. For example, if a lack of availability of broadband services is the main impediment to broadband adoption at home, then policies to expand usage may require attracting broadband providers to offer service. However, if there is a lack of information about broadband service availability, or a perceived lack of need or interest in broadband, then policies may incorporate public awareness campaigns.³⁵

Figure III.11 shows that, in the U.S., expense, lack of need, and lack of availability are the main impediments to broadband adoption for dial-up households.³⁶ One-third of dial-up users reported lack of need (33%), approximately one-third reported that broadband is too expensive (34%), and about one-fourth (27%) cited lack of availability. In the U.S., dial-up households accounted for three percent of households in 2010.

In contrast, almost one-half (47%) of households without a computer or home Internet access stated the lack of need as their main reason for not having home Internet services. Nearly one-fourth (24%) reported affordability, and 15% reported inadequate computer as the primary reason for no home Internet access. U.S. residents without a computer or home Internet access represent a much larger group (29%) than the collective dial-up households (representing about 3% of American households).³⁷

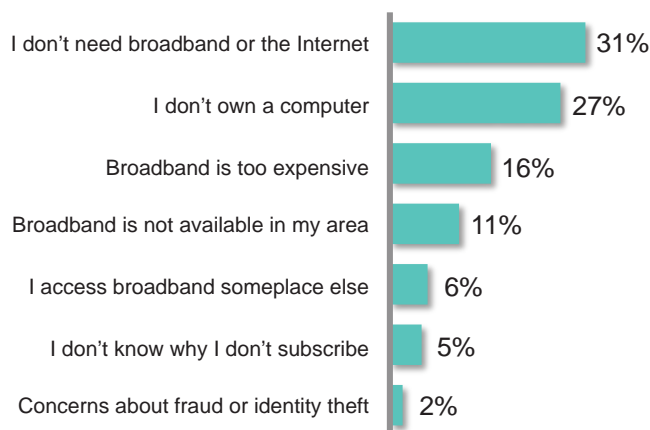
The top barriers to computer ownership and broadband adoption are lack of perceived relevance and affordability.

Figure III.11 - U.S. Broadband Adoption Barriers



Connect Puerto Rico's 2010 Residential Technology Assessment indicates similar barriers to technology adoption, as indicated in Figures III.12 and III.13.^{38*} Among Puerto Rican broadband non-adopters, the top barrier to computer ownership and broadband adoption is the lack of relevance that the technologies have to their everyday lives and endeavors.

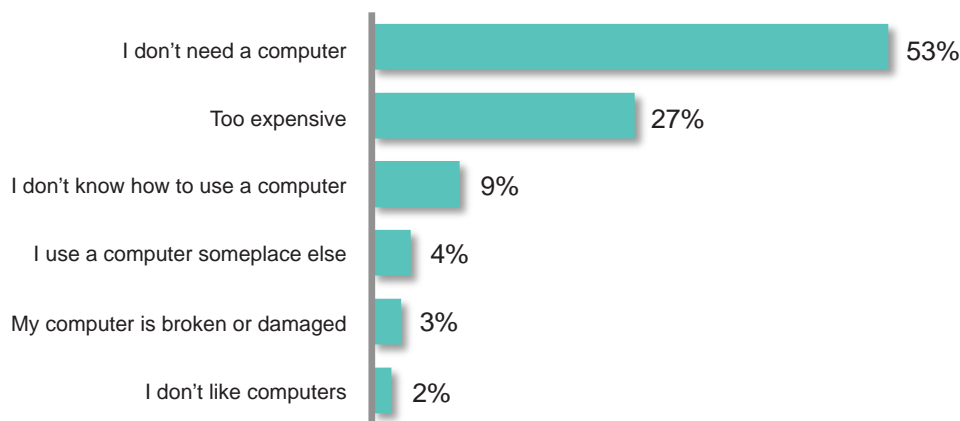
Figure III.12 - Puerto Rico Broadband Adoption Barriers



* Percentages do not add up to 100% because individuals could give multiple responses.

The top barrier to computer ownership in Puerto Rico is lack of perceived need.

Figure III.13 - Puerto Rico Computer Ownership Barriers



The barriers to adoption among Puerto Rico adults who do not have broadband in the home and those who do not own a computer at home are:

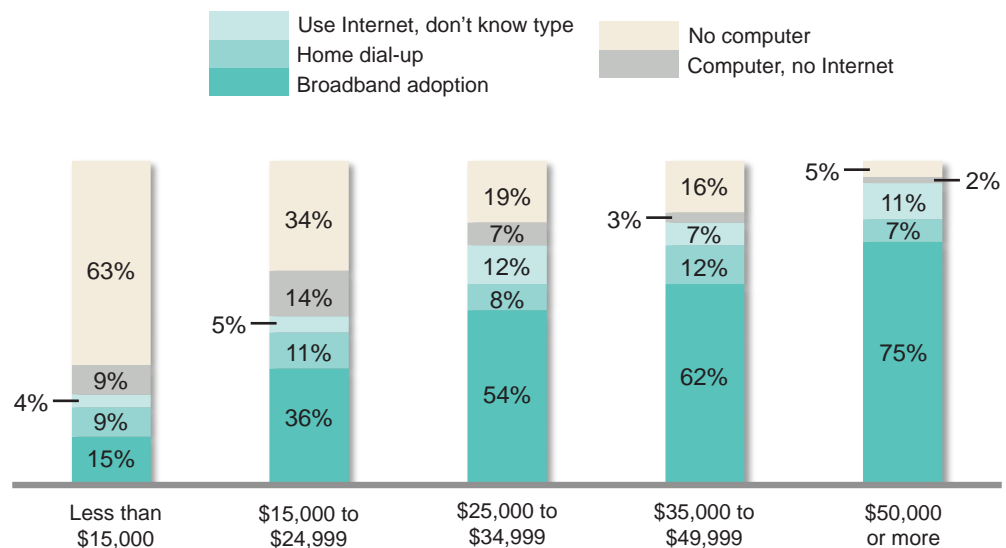
- **Relevance:** Thirty-one percent of Puerto Rico residents who do not have home broadband service say it is because they do not need Internet service. Fifty-three percent of residents who do not have a computer in the home say they do not need one.
- **Computer Ownership:** Twenty-seven percent of broadband non-adopters say that the lack of a home computer is a barrier to broadband adoption. Three percent of residents who do not have a computer in the home say that their previous computer is broken or damaged.
- **Affordability:** Sixteen percent of broadband non-adopters say broadband is too expensive while 27% percent of those lacking a computer in the home say it is because computers are too expensive.
- **Availability:** Eleven percent of Puerto Rico residents who do not subscribe to home broadband service report a lack of available broadband service as a barrier.
- **Other Locations:** Six percent of broadband non-adopters claim they access the Internet from somewhere else (8% of those without any home Internet access report accessing the Internet from somewhere else).
- **Digital Literacy and Perceived Online Risks:** Nine percent of non-computer-owners report that they do not have one because they don't know how to use a computer. Two percent of broadband non-adopters and three percent of Internet non-adopters report concerns about fraud and identity theft as a barrier to adoption.³⁹

c. Dividing Lines on Technology Adoption

Technology adoption is not distributed evenly in the population; however, the disparity becomes most glaring when income level is considered. Nearly two-thirds (63%) of Puerto Rico households in the lowest income category do not have a computer, compared to only 5% of the highest income households (Figure III.14).

If we focus on broadband, adoption exhibits a similar relationship with income. Only 15% of all households with annual incomes below \$15,000 reported having broadband Internet access at home, compared to three-fourths (75%) of households with incomes exceeding \$50,000. Dial-up service subscriptions account for a larger segment of lower-income households, although those households in the lowest income bracket still report significantly lower Internet adoption levels, regardless of connection type. This indicates that perhaps many people with low incomes simply cannot afford the costs associated with having an Internet connection at home.

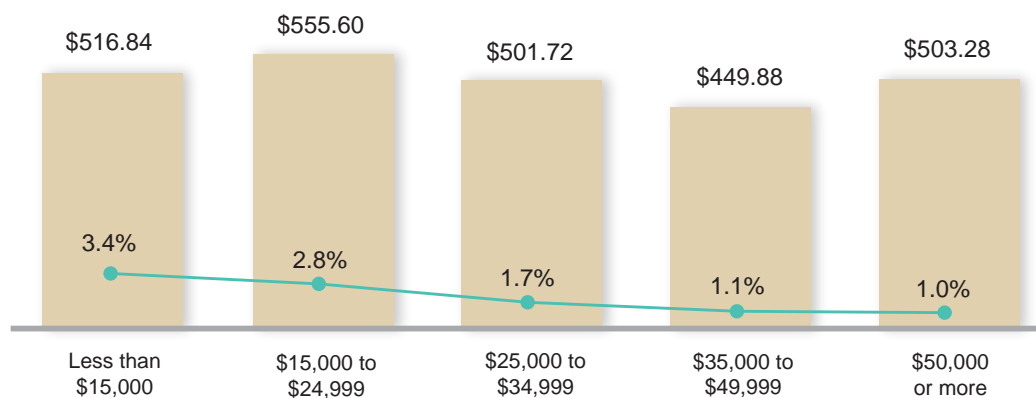
Figure III.14 - Computer and Internet Use by Household Income



For low income Puerto Ricans, lack of computer and subscription expense are key barriers to broadband adoption.

To put the income challenge in perspective, approximately 42% of Puerto Rico households have an annual income of less than \$15,000.⁴⁰ Connect Puerto Rico's residential survey revealed that households in this income group subscribing to home broadband pay \$43.07 monthly for their subscription, which equals \$516.84 annually, as seen in Figure III.15. For these residents, the cost of broadband represents approximately 3.4% of their annual income, which, according to the International Telecommunications Union, is considered unaffordable.⁴¹ In other words, by international standards, more than two-fifths of Puerto Rico residents do not have access to affordable broadband. If we consider that approximately six out of ten (60%) Puerto Rico residents have a median household income of less than \$25,000, it could be said that the majority of the households in Puerto Rico have difficulty accessing affordable broadband.

Figure III.15 - Annual Broadband Subscription Cost as a Percentage of Income



When asked what contributed to their decision to subscribe to broadband service, 20% of households in the lowest income bracket (those making less than \$15,000) responded that receiving (or purchasing) a computer for their home prompted them to subscribe. Additionally, 15% of households in this income bracket reported that the realization that broadband was worth the extra money contributed to their subscription. In comparison, only 7% of households reporting annual incomes of \$50,000 or more reported that realizing the value of broadband was a contributing factor in their decision to subscribe.

Those who do not subscribe to broadband offer a range of reasons for not being online. Affordability clearly comes to the forefront when Puerto Rico households are asked about the barriers to broadband adoption. Connect Puerto Rico's 2010 Residential Technology Assessment revealed that residents with the lowest incomes are significantly more likely to cite the lack of a computer or expense as barriers to a home broadband subscription, when compared to other income groups (Table III.6).

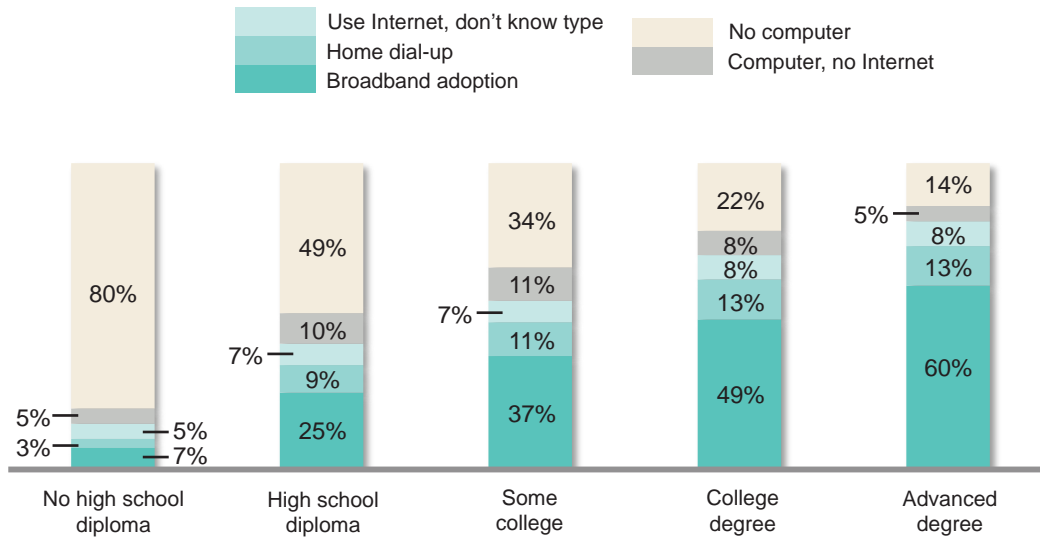
Table III.6 - Barriers to Broadband Adoption by Income					
Income Level	Percent of Population	Relevance	Lack of Computer	Too Expensive	Not Available
Puerto Rico Average	-	31%	27%	16%	11%
Less than \$15,000	42%	31%	33%	18%	10%
\$15,000 - \$24,999	18%	24%	23%	13%	15%
\$25,000 - \$34,999	12%	33%	17%	17%	17%
\$35,000 or more	28%	35%	12%	4%	13%

Regardless of income level, broadband's perceived lack of relevance is the most cited barrier to broadband adoption. What this means is that cutting prices alone will probably not have a major effect on broadband adoption. But lowering prices on service, coupled with adding programs that teach people the digital skills they need to access the Internet while also educating them on how the Internet can enhance their lives, could have a substantial effect.

Puerto Rico also has a unique opportunity to spur adoption by making broadband content relevant to non-adopters, regardless of socioeconomic background. For example, while income is the key driver to Puerto Rico's digital divide, the differences in adoption also break out prominently along educational attainment levels. Among Puerto Rican adults, approximately 42% of Puerto Ricans have had some college experience (even if they have not or did not graduate).⁴² Among those who have some college experience, 45% have a home broadband subscription, compared with 18% of those whose highest educational attainment is a high school diploma. If viewed at a more granular level, the digital divide is even more acute. As Figure III.16 presents, among Puerto Rican adults who have not graduated from high school, 20% have a home computer and only 7% have a home broadband subscription. As the data shows, the majority of residents with at least a high school diploma have a computer, and Internet adoption of any connection type increases directly with educational attainment.



Figure III.16 - Technology Adoption in the Home by Educational Attainment



Approximately one-third of residents with a high school diploma or less say that they do not need the Internet or broadband, or that the service isn't compelling enough to justify purchasing. These residents may lack the digital skills to utilize broadband or they may view broadband as an avenue to irrelevant content. These non-adopters, more so than residents with higher educational levels, are on the wrong side of the perceptual chasm with respect to broadband. Unlike broadband users, they are not attuned to online content's potential to provide information or opportunities for learning.⁴³ Additionally, residents with lower educational attainment are significantly more likely to report the lack of a computer as a barrier to home broadband subscription. As educational attainment rises, Puerto Rico residents are less likely to cite relevance and lack of a computer as reasons for not adopting. Instead, availability increases as the main barrier (Table III.7).

Table III.7 - Barriers to Broadband Adoption by Educational Attainment

Education Level	Percent of Population ⁴⁴	Relevance	Lack of Computer	Too Expensive	Not Available
Puerto Rico Average	-	31%	27%	16%	11%
Less than high school	33%	39%	34%	16%	6%
High school graduate	25%	32%	28%	16%	10%
Some college	12%	29%	24%	15%	13%
College graduate +	30%	19%	20%	15%	18%

Only 5% of Puerto Ricans 65 and older subscribe to broadband in the home. 80% do not own a computer.

In addition to income and education, Connect Puerto Rico's 2010 Residential Technology Assessment also found age to be a significant indicator of technology adoption. In fact, no other demographic group reported a lower broadband adoption level than senior citizens; residents over the age of 65. Residents in this age category report a broadband adoption rate of 5%, and only 20% have a home computer (Figure III.17). In comparison, the U.S. Census Bureau reported in 2010 that 45% of U.S. senior citizens subscribe to home broadband, and 55% own a home computer (Figure III.18).⁴⁵

Figure III.17 - Technology Adoption in the Home by Age

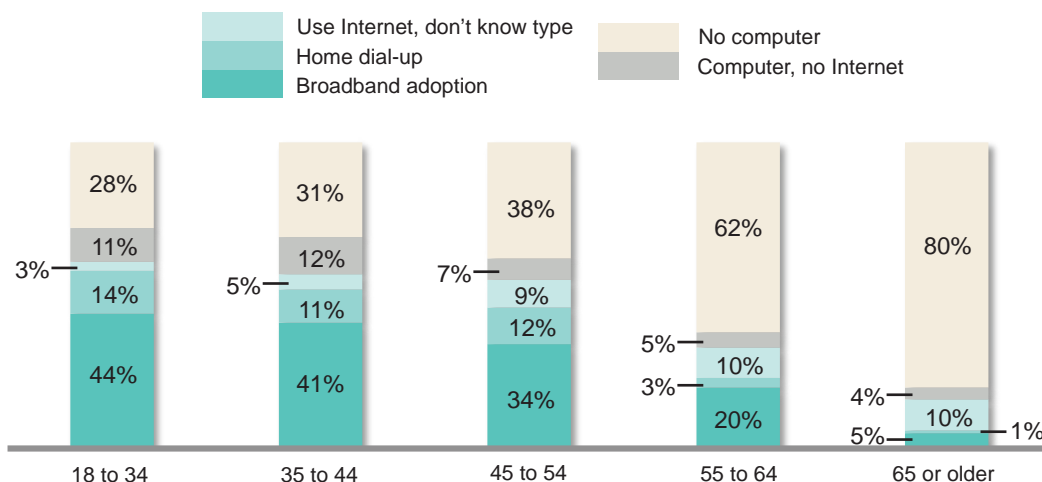
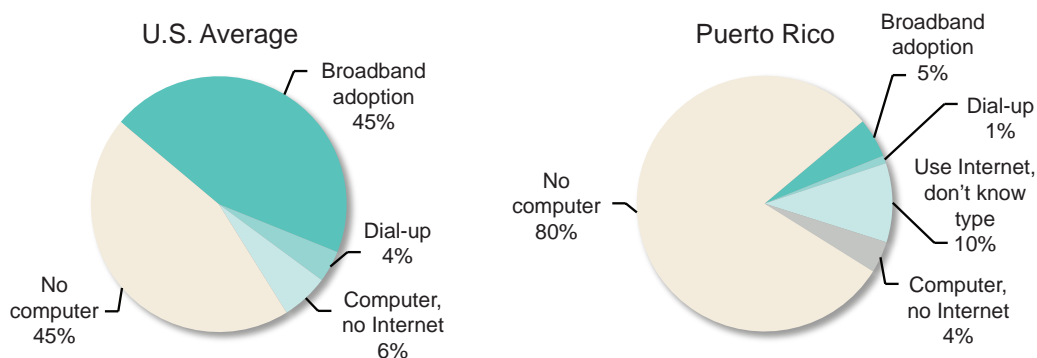


Figure III.18 - Technology Adoption Among Senior Citizens



The issue of relevance is very apparent among older Puerto Rico residents. Nearly two-fifths of residents between the ages of 45 and 64 (37%) cite relevance as a barrier to broadband adoption, and 43% of senior citizens cite the same barrier (Table III.8). In comparison, younger residents are much more likely to cite the lack of a home computer or expense as barriers to a home broadband subscription. More than one-third of residents ages 18 to 24 (35%) report the lack of a computer as a barrier to subscription.

Table III.8 - Barriers to Broadband Adoption by Age

Age	Percent of Population ⁴⁶	Relevance	Lack of Computer	Too Expensive	Not Available
Puerto Rico Average	-	31%	27%	16%	11%
18 to 24	10%	16%	35%	15%	14%
25 to 44	27%	20%	21%	18%	21%
45 to 64	24%	37%	28%	19%	8%
65 or older	14%	43%	32%	8%	1%

d. Internet Applications and Uses

To better understand how broadband is currently affecting the lives and endeavors of Puerto Ricans today, and what opportunities exist to expand the benefits of this technology, survey research conducted by Connect Puerto Rico explores the online applications used by Puerto Rico residents.⁴⁷

The top applications used by Puerto Rico Internet users include communicating with friends and family online, sending or receiving e-mail, using a search engine, and interacting through social networking sites.

- **Health:** Nearly one-half of Puerto Rico Internet users (45%) search for health or medical information online, while 10% interact with doctors or healthcare professionals online, and 8% communicate with their health insurance company.
- **Government Services:** E-government services are utilized by some Puerto Rico Internet users; 26% report that they search online for information about government services or policies; 8% conduct online transactions with government offices (such as e-filing taxes or filling out forms); 11% interact with Puerto Rico government offices; 8% interact with local government offices; and 3% interact with elected officials or candidates online.
- **Education:** Many Puerto Rico Internet users go online for educational purposes. More than one-half of Puerto Rico Internet users (56%) utilize the Internet to conduct research for schoolwork online, 18% interact with teachers online, and 11% take classes online.

Only 4% of employed adults report teleworking in Puerto Rico, while 43% would like to telework if allowed.

- **Employment and Entrepreneurship:** Puerto Rico residents also use the Internet for work purposes. Among Puerto Rico Internet users, 34% interact with their co-workers online, 37% go online to search for jobs or employment, 12% interact with businesses online, and 14% report that they go online to work from home at least occasionally. Furthermore, in Puerto Rico, 4% of employed adults report that they telework and 43% claim they would telework if allowed. Teleworking could also provide an additional boost to the state's workforce, as 16% of retirees, 26% of adults with disabilities, and 34% of homemakers said they would likely join the workforce if empowered to do so by teleworking.

When comparing these data to available U.S. data collected by the FCC, there is a lag in the degree and scope of online application usage among Puerto Rico residents who are Internet users. For example, 57% of U.S. Internet users get information about employment or apply for a job, compared to 37% in Puerto Rico; 75% of U.S. Internet users visit local, state, or federal government websites, compared to 26% of Puerto Rico Internet users who search online for information about government service or policies; and 22% of U.S. Internet users take online classes compared to 11% in Puerto Rico.⁴⁸

For more information regarding online activities among Puerto Rican Internet users, refer to slides 39-46 of the 2010 [Puerto Rico Residential Technology Assessment](#).⁴⁹

e. Conclusions

More than two-thirds of Puerto Ricans (69%) do not have a home broadband subscription. Furthermore, 55% of Puerto Rican households have broadband available, but choose not to subscribe.

The main dividing lines for adoption are among socioeconomic dimensions such as income and education:

- Among low-income Puerto Ricans – those whose annual incomes fall below \$15,000 – broadband adoption stands at 15%. This accounts for approximately 42% of the population. In comparison, 52% of households with annual incomes of \$15,000 or more report subscribing to home broadband service.
- 18% of adults whose highest level of education is a high school diploma are broadband users at home; 45% of adults who have attended or graduated from college are broadband users at home.

There are three primary reasons why the 69% percent of non-adopting Puerto Ricans do not have broadband: broadband is not sufficiently relevant for them to purchase it; lack of a computer; and cost.

- 31% of non-adopters do not have broadband because they do not need it or because they question its relevance in their lives
- 27% of non-adopters cite the lack of a computer as a barrier to home broadband adoption
- 16% of non-adopters report expense as a barrier to adoption

Creating the conditions necessary to promote broadband adoption and increase utilization requires a range of activities. The government of Puerto Rico has a role in providing support to people with low incomes, ensuring accessibility, funding sustainable community efforts, convening key stakeholders, and measuring progress.

2. Business Technology Assessment

Broadband is a powerful, enabling technology that is fast becoming an engine for economic growth. Increasingly, businesses seeking to open or expand operations look to see not only whether a community has robust broadband access, but also whether potential workers have digital literacy skills and tools. The economic future of communities in Puerto Rico depends on whether businesses and individuals fully utilize the technology to grow and develop local economies.

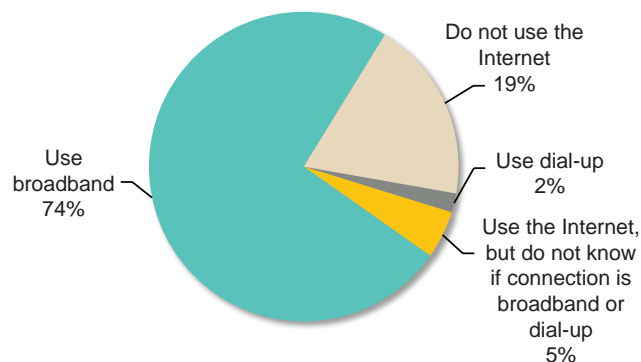
In order to assess business technology adoption in Puerto Rico, Connect Puerto Rico conducted a random digital dial (RDD) survey of 814 businesses contacted between August 5 and September 3, 2010. The purpose of this survey was to set benchmarks for technology adoption and barriers to adoption; determine best practices by identifying which applications Puerto Rican businesses use most often; and to measure the average price and speed of broadband adoption among business establishments across Puerto Rico. The 2010 Puerto Rico Business Technology Assessment can be viewed at the Connect Puerto Rico website: http://en.connectpr.org/research/business_technology_assessment.php.

Data were collected by telephone through live, computer-assisted interviews, with quotas set by business size and industry sector to ensure adequate representation of all businesses across the island. Weights were applied to correct for minor variations and to ensure that the sample matched the most recent U.S. Census estimates of the island's business establishments, as reported in their most recent County Business Patterns Report. The statewide full sample (n=814) provides a margin error of $\pm 5.1\%$ at the 95% level of confidence. These sample errors account for sample weighting, using the effective sample size. For the purposes of this survey, broadband is defined as "an Internet connection with speeds of 768 kilobits per second or higher in at least one direction."

Nearly three out of four Puerto Rican businesses (74%, or approximately 35,000 businesses) subscribe to broadband.

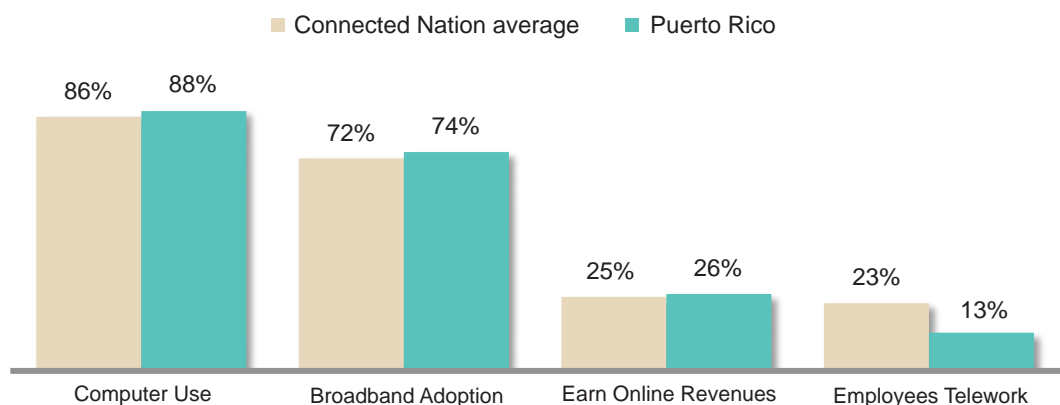
According to Connect Puerto Rico's 2010 Business Technology Assessment, nearly three out of four Puerto Rican businesses (74%, or approximately 35,000 businesses in Puerto Rico) subscribe to broadband.⁵⁰ At the same time, approximately 9,000 Puerto Rican businesses (or 19% of all business establishments in Puerto Rico) do not use the Internet at all, and 3,000 businesses either rely on dial-up or don't know what kind of Internet connection they have (Figure III.19). In comparison, a 2010 study completed by the FCC of U.S. businesses with 5 or more employees found that 95% have a broadband connection to a least one location.⁵¹

Figure III.19 - Technology Adoption among Puerto Rican Businesses



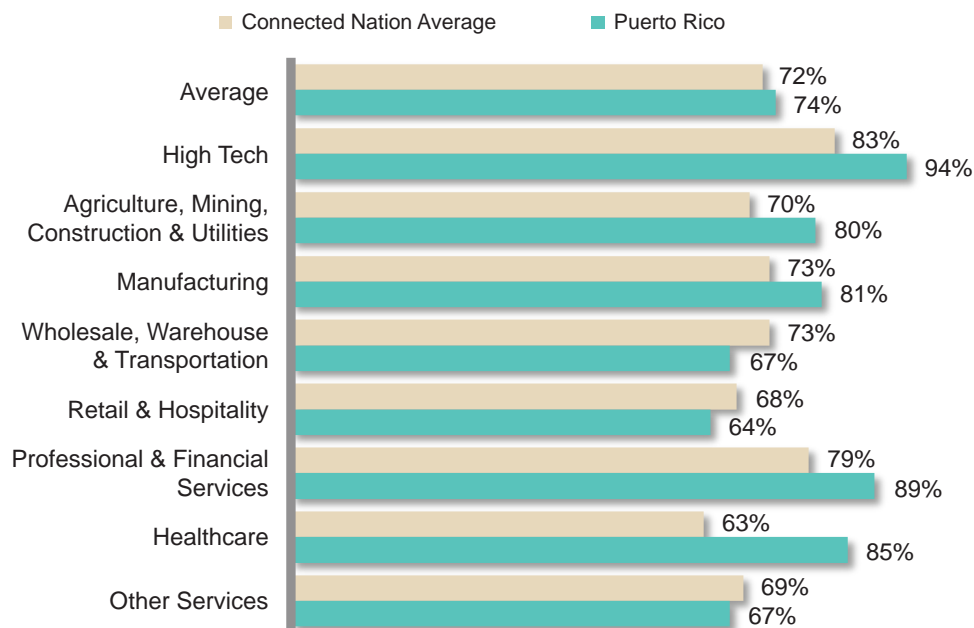
Puerto Rican businesses are on par with other jurisdictions surveyed by Connected Nation in terms of technology adoption. Overall, 88% of businesses in Puerto Rico (approximately 41,000 businesses) use computers, and over one-quarter of Puerto Rican businesses (26%) earn revenues from online sales, which is comparable to the average across all Connected Nation jurisdictions. On the other hand, only 13% of Puerto Rican businesses allow their employees to telework, which is below the Connected Nation average (Figure III.20).

Figure III.20 - Business Technology Adoption Comparison



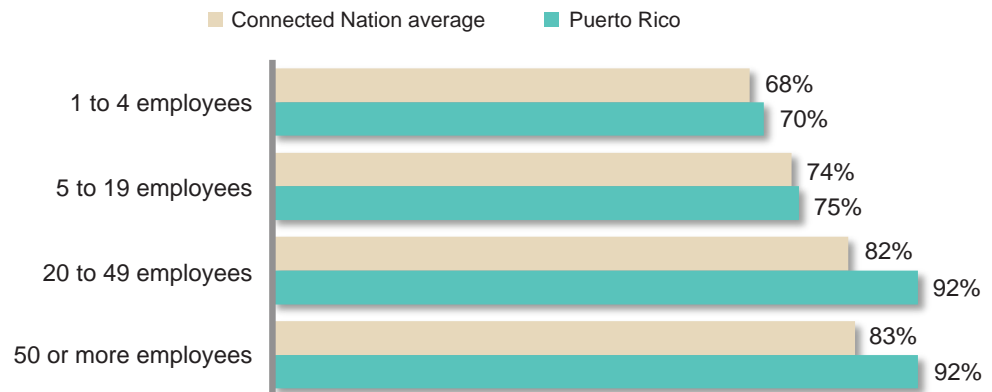
The Professional and Financial Services and High Tech sector lead in broadband adoption, with 89% of businesses in the Professional & Financial Services sector subscribing to broadband and 94% of businesses in the High Tech sector using broadband (Figure III.21). On the other extreme, adoption in crucial supply-chain sectors such as the Wholesale, Warehouse, and Transportation sector trails even further, as one-third of all Puerto Rico businesses in this sector still do not use broadband. Furthermore, only 64% of businesses in the Retail and Hospitality sector use broadband, which means that about 6,000 Retail and Hospitality related businesses do not subscribe.

Figure III.21 - Broadband Adoption by Sector



Broadband adoption rates in Puerto Rico mirror those in other Connected Nation jurisdictions by size and industry sector; there are no significant differences between Puerto Rico businesses and the average for each industry sector and size bracket (Figure III.21, III.22).

Figure III.22 - Broadband Adoption by Business Size

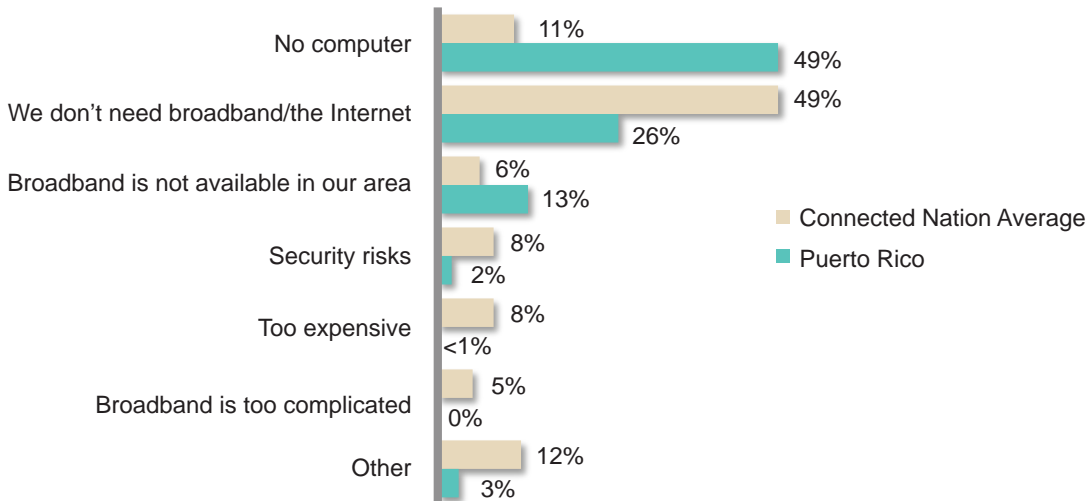


a. Barriers to Broadband Adoption Amongst Businesses

Compared to businesses located in other jurisdictions surveyed by Connected Nation, businesses located in Puerto Rico indicate more concrete barriers to broadband adoption. For example, among Puerto Rican businesses that do not subscribe to broadband, nearly one-half (49%, or 6,000 businesses) either do not use a computer to handle business functions, or cite the lack of a computer as a barrier to broadband adoption, while only 26% of non-adopting businesses report a perceived lack of need for broadband service (Figure III.23).⁵² Additionally, in comparison to businesses located in other jurisdictions surveyed by Connected Nation, non-adopting businesses in Puerto Rico are less likely to say that expense or security risks keep them from subscribing to broadband. Rather, the lack of available broadband service is a barrier to adoption for approximately 2,000 Puerto Rican businesses.



Figure III.23 - Barriers to Broadband Adoption



b. Business Broadband Cost and Speed

Puerto Rican businesses pay a median monthly price of \$83.93 for their broadband service, which is considerably higher than the median price of \$71.92 paid by all businesses located in jurisdictions surveyed by Connected Nation in 2010. Puerto Rican businesses also tend to subscribe to lower-than-average broadband speed of 3.9 Mbps, which is significantly lower than the average advertised download speed of 6.7 Mbps reported by businesses located in jurisdictions surveyed by Connected Nation.

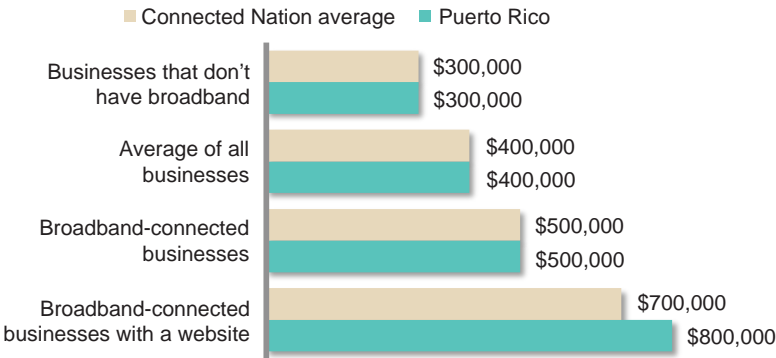
Additionally, broadband-connected Puerto Rico businesses are significantly more likely than other states surveyed by Connected Nation to say that they are not satisfied with their broadband service. Among Puerto Rico businesses that are not satisfied with their broadband service, nearly three out of four (74%, or approximately 1,000 businesses) cite frequent service outages as the reason they are unsatisfied.

c. The Financial Impact of Broadband Adoption

The impact of broadband on Puerto Rican businesses can be seen in the difference in revenues between businesses with and without broadband, the number of businesses that increase their revenues by using the Internet, and the number of businesses that empower their employees to telework.

Businesses with broadband subscriptions report median annual revenues that are \$200,000 higher than businesses that do not subscribe to broadband. In addition, Puerto Rico businesses that subscribe to broadband and maintain a website report median annual revenues that are \$500,000 higher than businesses that do not use broadband at all. Businesses in Puerto Rico with and without broadband subscriptions report annual revenues that are comparable to competitors in other states surveyed by Connected Nation (Figure III.24).

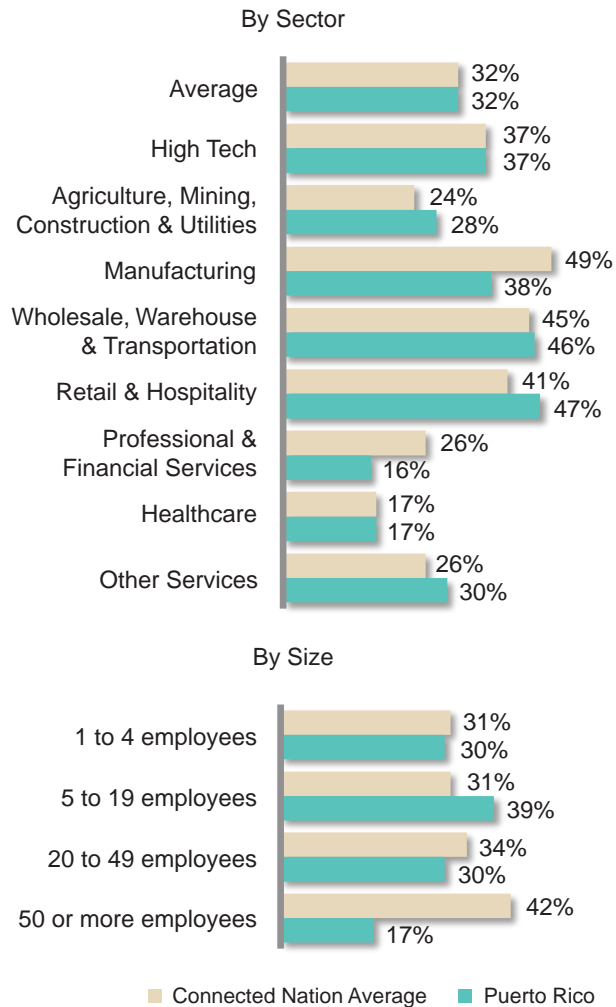
Figure III.24 - Median Annual Revenues (Self-Reported)



Island-wide, 32% of Internet-connected businesses in Puerto Rico (approximately 12,000 Puerto Rico businesses) report earning revenues through online sales and transactions, which is on par with the Connected Nation average of 32% (Figure III.25). In Puerto Rico, this includes approximately 1,000 businesses in the Wholesale, Warehouse, and Transportation sector and 5,000 businesses in the Retail and Hospitality sector.



Figure III.25 - Internet-connected Businesses that Earn Revenue from Online Transactions



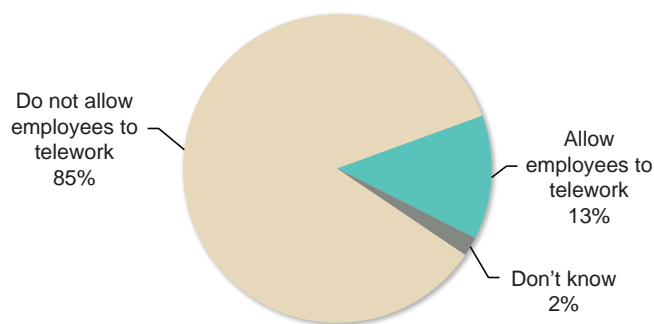
d. Business Uses for the Internet

Puerto Rican businesses use technology in ways that make the territory stand out and highlight ways that the island's unique character has influenced its workforce.

Across Puerto Rico, 13% of businesses (nearly 6,000) allow employees to telework.

- **Online Banking:** Nearly seven out of ten (69%) Internet-connected businesses utilize online banking. This is the most-cited use of the Internet among businesses in Puerto Rico and is most often used by Internet-connected businesses in the Manufacturing sector. In comparison, only 63% of all Internet-connected businesses located in jurisdictions surveyed by Connected Nation report banking online.
- **Marketing and Advertising of Products and Services:** Businesses located in Puerto Rico are significantly less likely than average to market and advertise their products and services online. While six out of ten Internet-connected businesses located in jurisdictions surveyed by Connected Nation utilize online marketing and advertising, only forty-two percent of Internet-connected Puerto Rican businesses do so.
- **Business Websites:** Four out of ten Puerto Rican businesses (40% or approximately 19,000) businesses have a website. Median annual revenues reported among broadband-connected businesses that have a website are \$800,000, twice that of the territory-wide average.
- **E-Government:** Island-wide, 60% of all Puerto Rican businesses (approximately 28,000 businesses) access Puerto Rico government websites, mostly to search for information about Puerto Rican government services or locations.
- **Fixed Wireless Broadband:** One out of five broadband-connected businesses (20%, or approximately 7,000 businesses) rely on fixed wireless broadband service, which is significantly higher than the average reported by businesses located in jurisdictions surveyed by Connected Nation.
- **New Adopters:** Many Puerto Rican businesses are new broadband adopters, as Puerto Rican businesses are significantly more likely than average to say they began using broadband less than a year ago.
- **Small Businesses:** Among small Puerto Rican businesses (those with fewer than five employees), businesses that sell goods or services online report that over one-third (36.3% on average) of their sales revenues come from online transactions.
- **Teleworkers:** In addition, broadband helps empower Puerto Rico's workforce by enabling workers to telework. Across Puerto Rico, 13% of businesses (approximately 6,000) allow employees to telework (Figure III.26). By comparison, 23% of businesses located in states and territories surveyed by Connected Nation allow their employees to telework.

Figure III.26 - Teleworking among Puerto Rico Businesses





e. Conclusions

Increasing broadband adoption among Puerto Rican businesses will require a concerted effort between the public and private sector.

More than one-quarter of Puerto Rico businesses (26%) do not use broadband, translating into 12,000 Puerto Rican business establishments that do not use broadband or benefit from the opportunities it offers. Furthermore, some sectors lag far behind. Only 64% of businesses in the Retail and Hospitality sector use broadband, which means approximately 6,000 Retail and Hospitality-related businesses do not subscribe.

There are three primary barriers non-adopting businesses report: the absence of a computer; the lack of a perceived need or benefit gained from broadband; and unavailability of broadband service.

- The most often cited barrier to broadband is the absence of a computer. Nearly one-half (49%, or 6,000 businesses) do not have a computer or cite that as a barrier to adoption.
- More than one-quarter (26% or 3,000 businesses) cite the perceived lack of need for broadband service.
- The lack of available broadband service is a barrier to 13% (or about 2,000) Puerto Rican businesses, and is reported more often by businesses in Puerto Rico than in other jurisdictions surveyed by Connected Nation.





Endnotes

¹ Department of Commerce, National Telecommunications and Information Administration. (2009). *Broadband Technology Opportunities Program*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/fr_bbnofa_090709.pdf

² Federal Communications Commission. (2011). *High-cost universal service support*. Retrieved from website: http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0206/FCC-11-161A1.pdf

Note: On October 27, 2011, the FCC voted for a vast reform of the High-Cost USF program to transition the legacy program from a system aimed to subsidize voice telephony to a system aimed to subsidize broadband build-out.

³ American Recovery and Reinvestment Act (ARRA) of 2009, Pub. L. No. 111-5, 123 Stat. 115, 516 (Feb. 19, 2009). Retrieved from website: http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=111_cong_bills&docid=f:h1enr.pdf

⁴ Participating Providers:

AT&T Mobility, Inc.
Ayustar Corporation
Critical Hub Networks
DataAccess Communications
Hughes Network Systems, LLC
Liberty Global, Inc.
MCI Communications Services, Inc.
Neptuno Media, Inc.
Puerto Rico Cable Acquisition Company, Inc.
PREPA Networks, LLC
Puerto Rico Telephone Company
Sprint Nextel Corporation
T-Mobile USA, Inc.
Worldnet Communications, Inc.

Non-Participating Providers:

Aeronet Wireless Broadband Corp. Provided backhaul data but did not supply last-mile fixed wireless data.
Orizon Wireless Corp. Never provided data for alleged fixed wireless service.
Telefónica International Holding, BV. No residential service; backhaul only. Provider did make contact but did not supply data.
San Juan Cable Holding, LLC, OneLink Communications. OneLink has been nonresponsive and has not submitted data. Field validation was completed to create estimated service area.

⁵ Questions regarding the maps and data collection can be directed to maps@connectpr.org

⁶ National Telecommunications and Information Administration, U.S. Department of Commerce. (2009). *Notice of funding availability (nofa) for the state broadband data and development grant program*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/fr_broadbandmappingnofa_090708.pdf

⁷ United States Department of Commerce, Bureau of the Census. (2000). *Census 2000 data for Puerto Rico*. Retrieved from website: <http://www.census.gov/census2000/states/pr.html>

⁸ A word about nomenclature of speed tiers. Broadband service speed capacity is typically reported based on download and upload speeds of service. Throughout the Puerto Rico Broadband Strategic Plan, we refer to such download and upload speeds in various ways, for example: 768 Kbps download and 200 Kbps upload speeds, or 768 Kbps download / 200 Kbps upload speeds, or 768 Kbps /200 Kbps speeds, or more simply 768/200.

⁹ Federal Communications Commission. (2010). *National Broadband Plan*. Retrieved from website: <http://www.broadband.gov/plan/3-current-state-of-the-ecosystem/>

¹⁰ Federal Communications Commission. (2011). *High-cost universal service support*. Retrieved from website: http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0206/FCC-11-161A1.pdf

¹¹ As required by the US Department of Commerce's State Broadband Initiative, if broadband service is available to at least one household in a Census Block, then for mapping purposes, that Census Block is reported to have some level of broadband availability. As such, broadband availability at an exact address location cannot be guaranteed. Providers supplying more specific data than Census Block are displayed as such. This map represents areas of broadband service availability determined by ongoing, in-depth technical analysis of provider networks and accommodations for the impact of external factors on service quality. However, this map does not include mobile wireless or satellite broadband services, which also may be available. Map users are encouraged to participate in improving broadband data granularity through data validation and field testing efforts. Learn more about this and other broadband mapping facts at <http://www.connectpr.org/>. Submit questions or recommended changes to: maps@connectpr.org.

¹² Federal Communications Commission. (2011). *High-cost universal service support*. Retrieved from website: http://transition.fcc.gov/Daily_Releases/Daily_Business/2012/db0206/FCC-11-161A1.pdf

¹³ Refer to endnote 11. Learn more about this and other broadband mapping facts at <http://www.connectpr.org/>. Submit questions or recommended changes to: maps@connectpr.org.

¹⁴ Ibid.

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ National Telecommunications and Information Administration, Federal Communications Commission. (2011). *National Broadband Map*. Retrieved from website: <http://www.broadbandmap.gov/>

¹⁸ Ibid.

¹⁹ Bureau of the Census, United States Department of Commerce. (2000). *United States Census 2000*. Retrieved from website: <http://www.census.gov/main/www/cen2000.html>

Note: Household density is defined as number of households per square mile of land area.

²⁰ National Telecommunications and Information Administration, U.S. Department of Commerce. (2009). *Notice of funding availability (nofa) for the state broadband data and development grant program*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/fr_broadbandmappingnofa_090708.pdf

Note: "Unserved area means a proposed funded service area, composed of one or more contiguous Census Blocks, where at least 90 percent of households in the proposed funded service area lack access to facilities based, terrestrial broadband service, either fixed or mobile, at the minimum broadband transmission speed (set forth in the definition of broadband above). A household has access to broadband service if the household can readily subscribe to that service upon request." SBI NOFA. "Underserved area means a proposed funded service area, composed of one or more contiguous Census Blocks meeting certain criteria that measure the availability of broadband service and the level of advertised broadband speeds. [...] Specifically, a proposed funded service area may qualify as underserved for last mile projects if at least one of the following factors is met, though the presumption will be that more than one factor is present: 1. No more than 50 percent of the households in the proposed funded service area have access to facilities-based, terrestrial broadband service at greater than the minimum broadband transmission speed (set forth in the definition of broadband above); 2. No fixed or mobile broadband service provider advertises broadband transmission speeds of at least three megabits per second ("mbps") downstream in the proposed funded service area; or 3. The rate of broadband subscribership for the proposed funded service area is 40 percent of households or less."

²¹ United States Department of Commerce, Bureau of the Census. (2000). *United States Census 2000*. Retrieved from website: <http://www.census.gov/main/www/cen2000.html>

Note: Household density is defined as number of households per square mile of land area.

²² Connected Texas, (2010). *The broadband landscape in the state of Texas*. Retrieved from website: http://www.connectedtx.org/sites/default/files/connected-nation/Texas/ctx_planning_report_final_web.pdf

²³ National Telecommunications and Information Agency, (2010). *Puerto Rico governor's office*. Retrieved from website: <http://www2.ntia.doc.gov/grantee/puerto-rico-governor's-office>

²⁴ Federal Communications Commission. (2010). *National Broadband Plan*. Retrieved from website: <http://www.broadband.gov/download-plan/>

²⁵ Connect Puerto Rico, (2010). *Connect Puerto Rico residential technology assessment results*. Retrieved from website: http://www.connectpr.org/sites/default/files/connected-nation/Puerto%20Rico/files/PR_RTA_2010Q1_FINAL.PDF
Note: Connect Puerto Rico interviewed 1,000 Puerto Rico households and 200 cell phone users via random telephone dialing for this technology assessment. The margin of error for this assessment is +3.1% at the 95% level of confidence. To access more information regarding the methodology of the 2010 Connect Puerto Rico Residential Technology Assessment, review slides 148-150.

²⁶ National Telecommunications & Information Administration, Economics & Statistics Administration (2011). *Exploring the digital nation: Computer and internet use at home*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf
Note: In October 2010, the U.S. Census Bureau within the Economics and Statistics Administration, in collaboration with the National Telecommunications and Information Administration, significantly expanded the Current Population Survey (CPS) to include new questions on computer and Internet use. The Census Bureau surveyed about 54,300 households, and through statistical methods extrapolated the survey results to represent 119.5 million American households.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Federal Communications Commission. (2010). *Broadband adoption and use in America: OBI working paper series no. 1*. Retrieved from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296442A1.pdf

³⁰ National Telecommunications & Information Administration, Economics & Statistics Administration (2011). *Exploring the digital nation: Computer and internet use at home*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

³¹ Ibid.

³² Connect Puerto Rico, (2011). *Broadband landscape*. Retrieved from website: <http://www.connectpr.org/broadband-landscape>

³³ National Telecommunications & Information Administration, Economics & Statistics Administration (2011). *Exploring the digital nation: Computer and internet use at home*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

³⁴ Connect Puerto Rico, (2010). *Connect Puerto Rico residential technology assessment results*. Retrieved from website: http://www.connectpr.org/sites/default/files/connected-nation/Puerto%20Rico/files/PR_RTA_2010Q1_FINAL.PDF

³⁵ National Telecommunications & Information Administration, Economics & Statistics Administration (2011). *Exploring the digital nation: Computer and internet use at home*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

³⁶ Ibid.

³⁷ Ibid.

³⁸ Connect Puerto Rico, (2010). *Connect Puerto Rico residential technology assessment results*. Retrieved from website: http://www.connectpr.org/sites/default/files/connected-nation/Puerto%20Rico/files/PR_RTA_2010Q1_FINAL.PDF

³⁹ Ibid.

⁴⁰ United States Department of Commerce, Bureau of the Census. (2010). *2006-2010 American community survey 5-year estimates: Puerto Rico community survey*. Retrieved from website: <http://www.census.gov/acs/www/>

⁴¹ United Nations Development Group, International Telecommunications Union. Retrieved from website: <http://www.itu.int/en/Pages/default.aspx>

Note: According to the ITU, broadband is considered “affordable” if its annual cost is no more than 3 percent of household income.

⁴² United States Department of Commerce, Bureau of the Census. (2010). *2006-2010 American community survey 5-year estimates: Puerto Rico community survey*. Retrieved from website: <http://www.census.gov/acs/www/>

⁴³ Federal Communications Commission. (2010). *Broadband adoption and use in America: OBI working paper series no. 1*. Retrieved from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296442A1.pdf

⁴⁴ United States Department of Commerce, Bureau of the Census. (2010). *2006-2010 American community survey 5-year estimates: Puerto Rico community survey*. Retrieved from website: <http://www.census.gov/acs/www/>

⁴⁵ National Telecommunications & Information Administration, Economics & Statistics Administration (2011). *Exploring the digital nation: Computer and internet use at home*. Retrieved from website: http://www.ntia.doc.gov/files/ntia/publications/exploring_the_digital_nation_computer_and_internet_use_at_home_11092011.pdf

⁴⁶ United States Department of Commerce, Bureau of the Census. (2010). *2006-2010 American community survey 5-year estimates: Puerto Rico community survey*. Retrieved from website: <http://www.census.gov/acs/www/>

⁴⁷ Connect Puerto Rico, (2010). *Connect Puerto Rico residential technology assessment results*. Retrieved from website: [http://www.connectpr.org/sites/default/files/connected-nation/Puerto Rico/files/PR RTA 2010Q1 FINAL.PDF](http://www.connectpr.org/sites/default/files/connected-nation/Puerto%20Rico/files/PR_RT_A_2010Q1_FINAL.PDF)

⁴⁸ Federal Communications Commission. (2010). *Broadband adoption and use in America: OBI working paper series no. 1*. Retrieved from: http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296442A1.pdf

⁴⁹ Connect Puerto Rico, (2010). *Connect Puerto Rico residential technology assessment results*. Retrieved from website: [http://www.connectpr.org/sites/default/files/connected-nation/Puerto Rico/files/PR RTA 2010Q1 FINAL.PDF](http://www.connectpr.org/sites/default/files/connected-nation/Puerto Rico/files/PR_RT_A_2010Q1_FINAL.PDF)

⁵⁰ Connect Puerto Rico, (2010). *Connect Puerto Rico business technology assessment results*. Retrieved from website: <http://www.connectpr.org/survey-results/business>

Note: The source for all Puerto Rico business data is the 2010 Connect Puerto Rico Business Technology Assessment, a random digit dial phone survey of 814 Puerto Rican businesses, including 133 businesses that do not subscribe to broadband service. This provides a margin of error for the territory-wide sample of $\pm 5.1\%$. Connected Nation Average data comes from similar phone surveys conducted of 9,650 business establishments in Alaska, Iowa, Kansas, Michigan, Minnesota, Nevada, Ohio, Puerto Rico, South Carolina, Texas, Florida, and Tennessee. This sample provides a margin of error of $\pm 1.6\%$ at the 95% confidence level.

⁵¹ Federal Communications Commission. (2010). *Business broadband capability survey results*. Retrieved from website: http://transition.fcc.gov/Daily_Releases/Daily_Business/2010/db1129/DA-10-2251A1.pdf

⁵² This response was collected differently in Puerto Rico than in other jurisdictions surveyed by Connected Nation, thus the percentage of Puerto Rican businesses that reported “no computer” as a barrier is not directly comparable to other jurisdictions surveyed by Connected Nation.

